UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/798,110	03/11/2004	Sergey Sukhobok	16811MDUS01U	5918

34645   7590   12/27/2006
JOHN C. GORECKI, ESQ.
P.O BOX 553
CARLISLE, MA 01741

EXAMINER
CHAUDRY, MUJTABA M

ART UNIT	PAPER NUMBER
2133	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/27/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

	Application No.	**Applicant(s)**
Office Action Summary	10/798,110	SUKHOBOK ET AL.
	Examiner	**Art Unit**	
	Mujtaba K. Chaudry	2133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 March 2004*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☒ Claim(s) *1-4,8,11 and 12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 March 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date *3/11/2004*.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claims 1-15 are presented for examination.

Information Disclosure Statement

The references listed in the information disclosure statement (IDS) submitted March 11, 2004 are

considered. The submission is in compliance with the provisions of 37 CFR 1.97. Form PTO-

1449 is signed and attached.

Oath/Declaration

The Oath filed March 11, 2004 complies with all the requirements set forth in MPEP 602 and

therefore is accepted.

Drawings

Figure 1 should be designated by a legend such as --Prior Art-- because only that which is

old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR

1.121(d) are required in reply to the Office action to avoid abandonment of the application. The

replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR

1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted

by the examiner, the applicant will be notified and informed of any required corrective action in

the next Office action. The objection to the drawings will not be held in abeyance.

Figure 3 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

The specification filed March 11, 2004 is accepted.

Claim Objections

Claim 1 is objected to because of the following informalities:

-   In line 4, the claim recites, "...**the code rate**." and it should recite, "...**the first code rate**." to show proper antecedent.

Appropriate correction is required.

Claim 2 is objected to because of the following informalities:

-   In line 3, the claim recites, "...**the code rate**." and it should recite, "...**the first code rate**." to show proper antecedent.

Appropriate correction is required.

Claim 3 is objected to because of the following informalities:

- In line 2, the claim recites, "...**generating a plurality of available matrices...**" and

    it should omit the term "**available**." If the matrices are available, then they don't need

    to be generated.

Appropriate correction is required.

Claim 4 is objected to because of the following informalities:

- In line 2, the claim recites, "...**for matrices not discarded...**" and it should recite,

    "...**for the matrices not discarded...**" to show proper antecedent.

Appropriate correction is required.

Claim 8 is objected to because of the following informalities:

- In line 2, the claim recites, "...**generating a plurality of available matrices...**" and

    it should omit the term "**available**." If the matrices are available, then they don't need

    to be generated.

Appropriate correction is required.

Claim 11 is objected to because of the following informalities:

- In line 4, the semicolon (;) after "and" is not needed and needs to be omitted.

- In line 8, the claim recites, "...**the code rate...**" and it should recite, "...**the first code

    rate...**" to show proper antecedent.

Appropriate correction is required.

Claim 12 is objected to because of the following informalities:

-   In line 2, the claim recites, "...**the code rate**..." and it should recite, "...**the first code rate**..." to show proper antecedent.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In lines 3-4, the claim recites, "...selecting a **small** set of codes with **advantageous** characteristics under high signal to noise ratio." The terms "small" and "advantageous" are relative terms and therefore are not definite. Applicant is suggested to avoid using relative terminology in the claims, unless the specification supports it. See MPEP 2173.05(b).

Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In line 1, the claim recites, "...the **advantageous** comprises..." The term "advantageous" is a relative term and therefore is not definite. Applicant is suggested to avoid using relative terminology in the claims, unless the specification supports it. See MPEP 2173.05(b).

Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In line 3, the claim recites, "...having **good** minimum distance..." The term "good" is a relative term and therefore is not definite. Applicant is suggested to avoid using relative terminology in the claims, unless the specification supports it. See MPEP 2173.05(b).

Appropriate correction and/or clarification is requested. To the extent possible, the Examiner will make interpretations in accordance with MPEP 2111.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-10 are rejected as being directed to non-statutory subject matter.

For example, claim 1 recites:

> *A method of designing low-density parity check codes, the method comprising the steps of:*
> - *creating a π-rotation parity check matrix having a first code rate; and*
> - *concatenating a first matrix to the π-rotation parity check matrix to increase the code rate.*

The claim language recites an abstract idea through mathematical operations. An idea of itself is

not patentable, but a new device which it may be made practically useful is. See i.e., *Rubber-Tip*

Pencil Co. v. Howard, 87 US (20 Wall.) 498, 507 (1874); *Mackay Radio & Telegraph Co. v.*

Radio Corp. of America, 306 US 86, 94, 40 USPQ 199, 202 (1939). It is the end result of the

process that is analyzed in order to determine if the claimed process yields a useful, concrete and

tangible result. Claim 1 of the present application merely recites to design the LDPC code and

makes no mention to practical application. The end result of the process is increasing the code

rate which may be useful and concrete but not tangible since the calculated code rate is not

recited as being used in a disclosed practical application or at least made available for use for

some form of conveyance (i.e., stored in memory). Therefore, claim as recited is not statutory

under 35 USC 101. See MPEP 2106.

Claims 2-10 depend from claim 1 and are rejected under 35 USC 101 for similar reasons.

Dependent claims 2-10 do not cure rejections made to claim 1.

Claims 11-15 are rejected as being directed to non-statutory subject matter.

For example, claim 11 recites:

> *A network element, comprising:*
> - *a processor,*
> - *at least one interface **configured** to engage in transmission on a communication network; and*
> - *control logic **configured** to create a parity check matrix for use by the interface to perform forward error correction on the transmissions on the communications network, the parity check matrix comprising a π-rotation parity check matrix having a first code rate; and*
> - *a first matrix concatenated to the π-rotation parity check matrix to increase the code rate of the π-rotation parity check matrix.*

The claim recites the term "configured" which is language that suggests or makes optional. See MPEP 2111.04. In other words if the interface is configured to transmit, it is not the same as transmitting. It is the end result of the process that is analyzed in order to determine if the claimed invention yields a useful, concrete and tangible result. Claim 11 of the present application recites that the transmission could take place and not that it actually does. Therefore the end result is increasing the code rate which may be useful and concrete but not tangible since the calculated code rate is not positively recited as being transmitted. However, omitting the term "configured" would make the claim statutory under 35 USC 101. See MPEP 2106.

Claims 12-15 depend from claim 11 and are rejected under 35 USC 101 for similar reasons. Dependent claims 12-15 do not cure rejections made to claim 11. In fact, claims 12-14 recite the term "configured" which needs to be omitted as well.

Claim Rejections - 35 USC § 103

The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 11 and 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rich Echard's paper: On the Construction of Some Deterministic Low-Density Parity Check

Codes (herein after: Echard) further in view of Dale E. Hocevar's <u>LDPC Code</u>

<u>Construction with Flexible Hardware Implementation</u> (herein after: Hocevar).

As per claim 1, Echard substantially teaches a method of designing low-density parity

check codes (i.e., title), the method comprising the steps of: creating a π-rotation parity check

matrix having a first code rate (i.e., page 74, lines 1-5); and concatenating a first matrix to the π-

rotation parity check matrix (i.e., page 75, Figure 5.1).

Echard does not explicitly teach the first matrix that is concatenated to actually increase

the code rate as stated in the present application.

However, Hocevar teaches, in an analogous art, to construct Low-density Parity-check

codes with a variety of code rates (i.e., title and col. 2, lines 9-10). Hocevar teaches (col. 2, lines

11-23) to construct a parity check matrix H with j rows and k columns with a code rate of R,

wherein $R \geq 1 - (j/k) \rightarrow R \geq (k-j) / k$. Hocevar further goes into detail (i.e., col. 2, paragraphs 3

and 4) in explaining the process of generating the matrix that will increase the code rate.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention

was made to use the technique disclosed by Hocevar to generate a matrix that would increase the

code rate when concatenating it with the π-rotation parity check matrix of Echard. This

modification would have been obvious to one of ordinary skill in the art because one of ordinary

skill in the art would have recognized that by generating a matrix, as taught by Hocevar, would

have increased the code rate when concatenating it with the π-rotation parity check matrix of

Echard and thereby made the coding system adaptive to various block sizes and code rates

(Hocevar, col. 1, paragraph 4).

As per claim 11, Echard substantially teaches a network element, comprising: a processor (i.e., page 93, line 7); at least one interface configured to engage in transmissions on a communication network (i.e., page 94, line 8—the transmitter is used to engage in transmissions); and control logic (i.e., page 98, Figure 6.5) configured to create a parity check matrix for use by the interface (i.e., pager 94, line 8) to perform forward error correction on the transmissions on the communication network, the parity check matrix comprising a π-rotation parity check matrix having a first code rate (i.e., page 74, lines 1-5); and first matrix concatenated to the π-rotation parity check matrix (i.e., page 75, Figure 5.1).

Echard does not explicitly teach the first matrix that is concatenated to actually increase the code rate as stated in the present application.

However, Hocevar teaches, in an analogous art, to construct Low-density Parity-check codes with a variety of code rates (i.e., title and col. 2, lines 9-10). Hocevar teaches (col. 2, lines 11-23) to construct a parity check matrix H with j rows and k columns with a code rate of R, wherein $R \geq 1 - (j/k) \rightarrow R \geq (k-j) / k$. Hocevar further goes into detail (i.e., col. 2, paragraphs 3 and 4) in explaining the process of generating the matrix that will increase the code rate. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the technique disclosed by Hocevar to generate a matrix that would increase the code rate when concatenating it with the π-rotation parity check matrix of Echard. This modification would have been obvious to one of ordinary skill in the art because one of ordinary skill in the art would have recognized that by generating a matrix, as taught by Hocevar, would have increased the code rate when concatenating it with the π-rotation parity check matrix of

Echard and thereby made the coding system adaptive to various block sizes and code rates

(Hocevar, col. 1, paragraph 4).

As per claim 13, Echard substantially teaches, in view of above rejections, code

generation software configured to generate the parity check code for use by the interface (i.e.

page 93, lines 3-5).

As per claim 14, Echard substantially teaches, in view of above rejections, the interface is

an antenna configured to perform one of transmission and reception of wireless signals on

wireless communication network (i.e., page 94, paragraph 2). The Examiner would like to point

out that a transmitting device inherently has to have an antenna in order to transmit data.

As per claim 15, Echard substantially teaches, in view of above rejections, routing

software to enable the network element to implement routing decisions on the communication

network (i.e., page 93, lines 3-7). The Examiner would like to point out that the distributed

processor design with software implementation taught by Echard includes routing decisions

since multiple receivers are present.

Allowable Subject Matter

Claims 2-10 and 12 are objected to as being dependent upon a rejected base claim, but

would be allowable if rewritten in independent form including all of the limitations of the base

claim and corrections made to overcome any objections and rejections under 35 USC 112 and 35
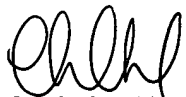
USC 101.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure. The references cited in the rejection above are from Applicant's IDS and therefore

are not included by the Examiner. However, additional pertinent prior arts are included herein.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Mujtaba K. Chaudry whose telephone number is 571-272-3817.

The examiner can normally be reached on Mon-Thur 9-7:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Albert DeCady can be reached on 571-272-3819. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mujtaba Chaudry
Art Unit 2133
December 20, 2006